Amendments to the Specification

industries. This has lead to an extraordinarily high level of knowledge on the toxicological properties and the biological degradation behavior of the anion component ($R'SO_4$). From this, the conclusion can be drawn that the disposal of the ionic liquids according to the invention "spent" in technical applications can be carried out without problems in biological clarification plants.

Detailed Description of the Invention

The present invention provides ionic liquids possessing a combination of most or all of the above-mentioned properties, thereby rendering them as ideal solvents and/or solvent additives for stoichiometric or catalytic chemical reactions and for their use as extraction agents and as heat carriers.

The invention provides an ionic liquid of the Formula 1

(cation)($R'SO_4$)
Formula 1

wherein:

the cation is selected from the group consisting of:

1) quaternary ammonium cation with the general formula $(NR_1R_2R_3R)^+$;

2) phosphonium cation with the general formula $(PR_1R_2R_3R)^+$;

3) imidazolium cation with the general formula

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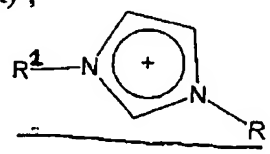

in which the imidazole core may be substituted with at least one group selected from C_1-C_6 alkyl groups, C_1-C_6 alkoxy groups, C_1-C_6 aminoalkyl groups, C_5-C_{12} aryl groups or C_5-C_{12}-aryl-C_1-C_6 alkyl groups;

4) pyridinium cation with the general formula

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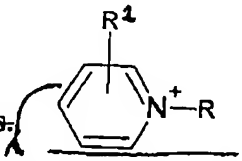

in which the pyridine core may be substituted with at least one group selected from C_1-C_6 alkyl group, C_1-C_6 alkoxy group, C_1-C_6 aminoalkyl group, C_5-C_{12} aryl group or C_5-C_{12}-aryl-C_1-C_6 alkyl group;

5) pyrazolium cation with the general formula

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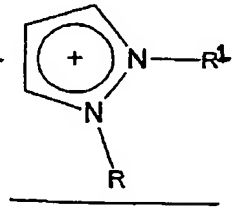
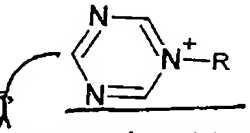


in which the pyrazole core may be substituted with at least one group selected from C_1-C_6 alkyl group, C_1-C_6 alkoxy group, C_1-C_6 aminoalkyl group, C_5-C_{12} aryl group or C_5-C_{12}-aryl-C_1-C_6 alkyl group; and

6) triazolium cation with the general formula



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in which the triazole core may be substituted with at least one group selected from C_1-C_6 alkyl groups, C_1-C_6 alkoxy groups, C_1-C_6 aminoalkyl groups, C_5-C_{12} aryl groups or C_5-C_{12}-aryl-C_1-C_6 alkyl group;

wherein and the radicals R^1, R^2, R^3 are selected independently of each other from the group consisting of:

- hydrogen;

- linear or branched, saturated or unsaturated, aliphatic or alicyclic alkyl groups with 1 to 20 carbon atoms;

- heteroaryl groups, heteroaryl-C_1-C_6 alkyl groups with 3 to 8 carbon atoms in the heteroaryl radical and at least one heteroatom selected from N, O and S which may be substituted with at least one group selected from C_1-C_6 alkyl groups and/or halogen atoms;

- aryl, aryl-C_1-C_6 alkyl groups with 5 to 12 carbon atoms in the aryl radical, which may optionally be substituted with at least one C_1-C_6 alkyl group and/or a halogen atom; and

the radical R is selected from the group consisting of:

- linear or branched, saturated or unsaturated, aliphatic or alicyclic alkyl groups with 1 to 20 carbon atoms;

- heteroaryl-C_1-C_6 alkyl groups with 3 to 8 carbon atoms in the aryl radical and at least one heteroatom selected from N, O and S, which may be substituted with at least one C_1-C_6 alkyl group and/or halogen atom;

- aryl-C_1-C_6 alkyl groups with 5 to 12 carbon atoms in the aryl radical, which may be substituted with at least one C_1-C_6 alkyl group and/or halogen atom; and

R' is selected from the group consisting of a linear or branched, saturated or unsaturated, aliphatic or alicyclic, functionalized or non-functionalized alkyl radical with 3-36 carbon atoms, wherein R' is optionally functionalized with one or more X groups, wherein X is selected from the group consisting of an –OH, -OR'', -COOH, -COOR'', $-NH_2$, $-SO_4$, -F, -Cl, -Br, -I or –CN,